

BUILDING TECHNOLOGY WORKSHOP FACILITIES AS A CORRELATE OF STUDENTS' ENROLMENT IN FEDERAL COLLEGES OF EDUCATION (TECHNICAL) IN NORTH EAST, NIGERIA

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ABSTRACT

Federal colleges of education (Technical), which are meant to equip students with skills, often operate with outdated and inadequate workshop facilities, contributing to a decline in students' enrollment. The main purpose of this study was to determine the extent to which the available building technology workshop facilities as a correlate of students' enrolment in Federal Colleges of Education (Technical) in North East, Nigeria. The study was guided by two purposes and two research questions. The study adopts correlational research design. The area of the study is North-East geo-political zone of Nigeria. The study was conducted in: Gombe and Yobe States. The population of this study was thirty-seven (37) respondents. Census sampling technique was adopted. Proforma and structured questionnaire was used as the instruments. Mean and standard deviation were used to answer research questions. The data for the study was analyzed using statistical package for social sciences (SPSS) version 27. The study findings reveal that the available building technology tools correlate with students' enrolment to a high extent, while equipment correlate with students' enrolment to a moderate extent. Based on the findings of the study, the study recommends that College Management, with support from the Governing council, should establish collaborations with local industries to keep the curriculum and facilities aligned with current industry practices, enhancing the program's relevance and attracting more students.

Keywords: Technology Education, Building Technology, Workshop Facilities, and Students' enrolment

1 INTRODUCTION

Education is a vital aspect of human development, encompassing the acquisition of knowledge, skills, and values that enable individuals to participate fully in society. It involves the transmission of knowledge, skills, and cultural values from one generation to another [1]. Education serves as a guiding light that illuminates the path of human progress. Its purpose extends far beyond mere literacy; it fosters critical thinking, creativity, and self-reliance. When individuals are receptive to change, they open the door to advancement in all areas of life. Through education, creativity can be cultivated, and innovations can emerge from both students and teachers, ultimately contributing to a brighter and more sustainable future [2]. Within this broad framework, technology education plays a pivotal role in equipping learners with the practical and cognitive skills required for technological innovation and productivity. Technology education is the study and ethical practice of facilitating learning and improving performance through the

creation, use, and management of technological processes and resources [3]. Furthermore, the level of students' enrolment in technical and vocational programs serves as an important indicator of the relevance and attractiveness of these disciplines within the education sector [4]. One of the critical programs offered in technical and vocational institutions is Building Technology, which focuses on the practical application of scientific and technical knowledge in the design, construction, and maintenance of buildings. It encompasses the integration of materials, systems, and construction methods necessary for the sustainable development of the built environment [5]. The success of any technical or technology-based program largely depends on the adequacy and functionality of its workshop facilities. These facilities include physical infrastructure, tools, equipment, and utilities used for effective practical instruction and skill development. Well-equipped workshops provide learners with the opportunity to translate theoretical knowledge into practical experience, thereby enhancing competence, creativity, and confidence in real-life work situations [6]. The Federal Colleges of Education (Technical) are specialized institutions that offer vocational and technical training aimed at equipping students with practical skills and knowledge necessary for self-reliance and gainful employment in various industries. [7] the primary aim of these colleges is to produce qualified technical trade teachers and practitioners capable of teaching introductory technology in junior secondary schools, as well as National Certificate of Education (NCE Technical) graduates who will be able to inculcate scientific and technological attitudes and values into society [8]. To achieve these objectives, technical institutions place great emphasis on workshop practices in addition to classroom instruction, thereby ensuring that students acquire both theoretical and practical competencies [6]. From the foregoing, it appears that much of the theoretical research emphasis has been placed on assessing the state of building technology workshop facilities in technical colleges, colleges of education (technical), and universities. However, little or no empirical research has been conducted on the relationship between building technology workshop facilities and students' enrolment in Federal Colleges of Education (Technical) in Northeast Nigeria. Technical colleges, which are designed to equip students with practical skills for self-reliance, often operate with outdated and deteriorating workshop facilities. These include obsolete tools, equipment, machines, consumables, infrastructure, and measuring instruments. The inadequacy and limited availability of these facilities can negatively affect students' learning experiences and may contribute to declining enrolment rates [7].

2 METHODOLOGY

This study adopted a correlational research design. The design was chosen because the researcher sought to determine the extent to which building technology workshop facilities correlate with students' enrolment in Federal Colleges of Education (Technical) in North East Nigeria. The study was carried out in the North-East geopolitical zone of Nigeria, specifically in Gombe and Yobe States. Gombe State, located in the northeastern region, is a landlocked state known for its strategic location and cultural diversity. It shares boundaries with five states: Yobe to the north, Taraba to the south, Adamawa to the east, Borno to the northeast, and Bauchi to the west. The population of the study comprised 37 staff members of the Building Technology Departments from the Schools of Technical Education at Federal College of Education (Technical), Gombe and Federal College of Education (Technical), Potiskum. The researcher employed a census sampling technique, as the entire population was small and therefore manageable for the study. Two instruments were used for data collection: A Proforma and a Structured Questionnaire. The instruments were subjected to face and content validity by two experts — one from the Department of Technology Education, Modibbo Adama University, Yola, and the other from the School of Technical Education, Federal College of Education (Technical), Gombe. The validators assessed the instruments for grammatical accuracy, appropriateness, and relevance to the research objectives. A pilot test was conducted at the Federal College of Education (Technical), Bichi, Kano State, which was outside the study area. The purpose of the pilot test was to establish the reliability of the instrument. Data from the pilot test were analyzed using the Cronbach's Alpha statistic with the aid of the Statistical Package for the Social Sciences (SPSS) to determine internal consistency. The researcher, assisted by two trained research assistants, personally administered the instruments to respondents in their respective colleges. This direct approach facilitated prompt and accurate completion of the questionnaires. Data collected were analyzed using the Statistical Package for the Social

Sciences (SPSS) Version 27. Mean and standard deviation were employed to answer the research questions, while linear regression analysis was used to test the research hypotheses.

3 RESULTS AND DISCUSSIONS

This chapter presents the results obtained in this study as well as the analysis of data carried out for the purpose of clarity and logical presentation. The chapter presents the data analysis, results and discussions according to the research questions that guided the study.

Research Question 1: To what extent do the available building technology tools correlate students' enrolment in building technology in Federal Colleges of Education (Technical) in North East Nigeria? Table 1 shows the extent at which the available building technology tools correlate students' enrolment in building technology in Federal Colleges of Education (Technical) in North East Nigeria. The grand mean of 4.18, implies that to a high extent at which the available building technology tools correlate students' enrolment in building technology in Federal Colleges of Education (Technical) in North East, Nigeria.

Table 1. Mean and Standard Deviations on the Extent at which the available Building Technology Tools correlate with Students' Enrolment

n = 33				
S/N	Statement	$\bar{x}$	SD	Remark
	The extent at which the following building tools correlate students' enrolment in the workshop:			
1.	Trowels (assorted)	4.48	0.51	HE
2.	Cutting Chisels	4.45	0.56	HE
3.	Cold Chisels	4.03	0.77	HE
4.	Club hammers	4.12	0.82	HE
5.	Float woods	4.45	0.51	HE
6.	Diggers	4.09	0.88	HE
7.	Buckets	4.33	0.6	HE
8.	Head pans	4.3	0.64	HE
9.	Spades/Shovels	4.45	0.62	HE
10.	Spot boards	3.82	0.81	HE
11.	Pix axes	3.85	0.94	HE
12.	Watering cans	3.79	0.78	HE
	Grand Mean	4.18	0.7	HE

Key: $\bar{x}$ = Mean Response, SD = Standard Deviation, N = Total Number of Respondents, HE = High Extent

Research Question 2: To what extent do the available building technology equipment correlate students' enrolment in building technology in Federal Colleges of Education (Technical) in North East Nigeria? Table 2 presents the extent at which the available building technology equipment correlate students' enrolment in building technology in Federal Colleges of Education (Technical) in North East Nigeria. The grand mean of 3.31 implies that building technology equipment has a moderate correlation on students' enrollment in building technology programs in Federal Colleges of Education (Technical) in North East, Nigeria.

Table 2. Mean and Standard Deviations on the Extent at which the available building technology Equipment correlate with Students' Enrolment

n = 33				
S/N	Statement	$\bar{x}$	SD	Remark
	The extent at which the following building equipment correlate students' enrolment in the workshop:			
1.	Concrete Mixer	3.91	0.89	HE
2.	Compacting factor apparatus	3.79	0.96	HE
3.	Poker Vibrators	3.39	1.06	ME
4.	Vee-Bee apparatus	3.18	1.18	ME
5.	Atterberg limit	3.06	1.03	ME
6.	Screed board vibrator	3.27	1.13	ME
7.	Vibratory rammer	3.18	1.16	ME
8.	Hydraulic Press	3.24	1.2	ME
9.	Mobile Scaffolding	3.5	0.84	HE
10.	Air Compressor	3.21	1.19	ME
11.	Concrete Cutting Saw	2.91	1.1	HE
12.	Vibrating Table	3.06	1.14	ME
	Grand Mean	3.31	1.07	ME

Key: $\bar{x}$ = Mean Response, SD = Standard Deviation, N = Total Number of Respondents, HE = High Extent, ME = Moderate Extent

H₀₁: Building technology tools do not significantly correlate with students' enrolment in building technology in Federal Colleges of Education (Technical) in North East Nigeria. The regression analysis results in Table 3 shows the relationship between building technology tools and students' enrollment in Building Technology at Federal Colleges of Education (Technical) in North-East Nigeria. The regression analysis in Table 8a shows a moderate extent correlation ($R = 0.516$) between building technology tools and students' enrollment in Building Technology at Federal Colleges of Education (Technical) in North East Nigeria. With $R^2 = 0.266$, building technology tools explain 26.6% of the variation in enrollment, while the remaining 73.4% is correlates by other factors. The Adjusted R^2 (0.243) accounts for potential and overestimation, the Standard Error of the Estimate (0.44168) indicates the model's prediction accuracy. These results suggest that while building technology tools moderately correlate enrollment, other variables also significantly correlate students' decisions

Table 3. Model Summary of Regression Analysis between Building Technology Tools and Students' Enrolment at Federal Colleges of Education (Technical)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.516 ^a	0.266	0.243	0.44168

a. Predictors: (Constant), Building Technology Tools

The regression analysis in Table 4 reveals that building technology tools have a significant correlation on students' enrollment in Building Technology at Federal Colleges of Education (Technical) in North East Nigeria. The F-value (11.251) with a p-value of 0.002 indicates that the model is statistically significant at $p < 0.05$, meaning that building technology tools significantly correlate enrollment extent. The regression sum of squares (2.195) suggests that a notable proportion of the variance in students' enrollment is explained by building technology tools, while the residual sum of squares (6.048) represents unexplained factors. This result implies building technology tools significantly correlate with students' enrolment in

building technology in Federal Colleges of Education (Technical) in North East Nigeria. Hence, the hypothesis is rejected.

Table 4. Summary of Regression Analysis between Building Technology Tools and Students' Enrolment at Federal Colleges of Education (Technical)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.195	1	2.195	11.251	0.002 ^b
	Residual	6.048	31	0.195		
	Total	8.242	32			

a. Dependent Variable: students' enrollment

b. Predictors: (Constant), Building Technology Tools

The regression coefficients in Table 5 further support the relationship between building technology tools and students' enrollment in Building Technology at Federal Colleges of Education (Technical). The unstandardized coefficient for building tools is 0.464, meaning that for every unit increase in the available building technology tools, students' enrollment increases by 0.464 units. The standardized coefficient (Beta = 0.516) indicates a moderate correlation between building technology tools and enrollment. The t-value (3.354) and the p-value (0.002) confirm that this relationship is statistically significant at $p < 0.05$, suggesting that the available building technology tools has a strong and significant correlate on students' decision to enroll in Building Technology programs

Table 5. Summary of Regression Coefficients of Correlation between Building Technology Tools and Students' Enrolment at Federal Colleges of Education (Technical)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.417	0.621		3.889	0.000
	Building technology Tools	0.464	0.138	0.516	3.354	0.002

a. Dependent Variable: students' enrollment

H₀₂: Building technology equipment do not significantly correlate with students' enrolment in building technology in Federal Colleges of Education (Technical) in North East Nigeria. The regression analysis results in Table 6 shows the relationship between building technology equipment and students' enrollment in Building Technology at Federal Colleges of Education (Technical) in North East Nigeria. The results in Table 9a reveal a strong correlation between building technology equipment and students' enrollment in building technology at Federal Colleges of Education (Technical). The R value of 0.761 indicates a substantial relationship between the two variables, and the R Square value of 0.579 means that approximately 57.9% of the variation in students' enrollment can be explained by the availability of building technology equipment. The Adjusted R Square value of 0.565 suggests that the model remains reliable even after accounting for the number of predictors. The Standard Error of the Estimate is 0.33455, reflecting a moderate extent of prediction error. These results suggest that building technology equipment has a significant and high extent correlation on students' enrollment in building technology programs

Table 6. Model Summary of Regression Analysis between Building Technology Equipment and Students' Enrolment at Federal Colleges of Education (Technical)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.761 ^a	0.579	0.565	.33455

a. Predictors: (Constant), Building Technology Equipment

The results presented in Table 7 indicate that building technology equipment has a statistically significant correlation on students' enrollment in building technology programs at Federal Colleges of Education (Technical). The F-value of 42.643 with a significance extent (Sig.) of 0.000 shows that the regression model is highly significant. Additionally, the sum of squares for the regression is 4.773, and the residual sum of squares is 3.470, suggesting a good fit of the model and a relatively low error in prediction. Overall, the analysis supports the hypothesis that building technology equipment significantly correlates with students' enrollment. Hence, the available building technology equipment significantly correlates with students' enrolment in building technology in Federal Colleges of Education (Technical) in North East Nigeria. Therefore, the null hypothesis is rejected.

Table 7. Summary of Regression Analysis between Building Technology Equipment and Students' Enrolment at Federal Colleges of Education (Technical)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.773	1	4.773	42.643	0.000 ^b
	Residual	3.470	31	0.112		
	Total	8.242	32			

a. Dependent Variable: students' enrollment

b. Predictors: (Constant), Building Technology Equipment

The results in Table 8 shows that building technology equipment has a significant positive relationship with students' enrollment in building technology programs at Federal Colleges of Education (Technical). The unstandardized coefficient for building technology equipment is 0.502, which indicates that for each unit increase in building technology equipment, students' enrollment is expected to increase by 0.502 units, holding other factors constant. The standardized coefficient (Beta) is 0.761, which suggests a high correlation between building equipment and student enrollment. The t-value of 6.530 and Sig. value of 0.000 further confirm the statistical significance of this relationship. Thus, the analysis supports the hypothesis that building technology equipment significantly correlates with students' enrollment in building technology programs.

Table 8. Summary of Regression Coefficients of Correlation between Building Technology Equipment and Students' Enrolment at Federal Colleges of Education (Technical)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.463	0.315		7.820	0.000
	Building technology Equipment	0.502	0.077	0.761	6.530	0.000

a. Dependent Variable: students' enrollment

3.1 FINDINGS

Based on the results presented, the following findings revealed that: To a high extent the available building technology tools correlate students' enrolment in building technology. The supporting hypothesis revealed that available building technology tools significantly correlates with students' enrolment in building technology in Federal Colleges of Education (Technical) in North East Nigeria. The available building technology equipment has a moderate extent correlation on students' enrollment in building technology programs. The supporting hypothesis revealed that available building technology equipment significantly correlates with students' enrolment in building technology in Federal Colleges of Education (Technical) in North East Nigeria.

3.2 DISCUSSION OF FINDINGS

The findings of this study indicate that the availability of building technology tools has a significant correlation with students' enrolment in building technology programs in Federal Colleges of Education (Technical) in North East Nigeria. This aligns with the view of [9], who emphasized the crucial role that a well-equipped educational environment plays in attracting and retaining students, especially in technical disciplines such as building technology. According to their perspective, students are more inclined to enroll in and remain committed to programs that provide the essential tools and equipment necessary for practical, hands-on learning experiences. Similarly, [10] assert that the presence of modern and functional tools in technical education not only enhances students' learning experiences but also serves as a motivating factor for choosing such programs. This is particularly important in the context of building technology, where the curriculum heavily emphasizes the development of practical skills. As such, the findings of this study reinforce the significance of equipping technical institutions with adequate tools to support increased enrolment and student engagement in building technology programs. Furthermore, the study revealed a moderate correlation between the availability of building technology equipment and students' enrolment, which is consistent with the findings of [11]. Their research demonstrated that access to up-to-date and functional equipment is critical in improving the practical components of technical education, particularly in specialized areas like building technology. They highlighted that students are more likely to be drawn to programs that align with their aspirations for acquiring industry-relevant, hands-on skills. In the same vein, [12] emphasized that the availability of appropriate building technology equipment is a key factor in motivating prospective students to enroll, as access to the right tools is essential for effective skill acquisition. Therefore, the results of this study agree with existing literature, confirming that the provision of adequate and functional equipment plays a significant role in influencing students' decisions to pursue building technology programs.

4 CONCLUSIONS

The study concluded that the availability of building tools, correlate with students' enrolment in building technology to a high extent, while equipment correlates with students' enrolment in building technology to a moderate extent in Federal Colleges of Education (Technical) in North East Nigeria.

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